PURCHASE DESCRIPTION

WIDEBAND MICROWAVE SIGNAL GENERATOR (50 MHz to 26.5 GHz)

FSNTP-B

1.0 GENERAL This procurement requires an all solid state, synthesized, wideband microwave signal generator covering a frequency range of 50 MHz to 26.5 GHz and including the ability to measure external frequencies* and external power levels. Plug-ins are NOT acceptable for any portion of this equipment.

2.0 CLASSIFICATION The signal generator described herein shall meet the requirements of MIL-T-28800D, Type III, Class 5, Style E, Color R for Navy shipboard, submarine and shore applications with the following modifications and exceptions:

a. Non-operating temperature: -40˚C to +70˚C

b. Temperature/humidity: Non-condensating

c. Altitude: Not required

d. The equipment warm-up period is 20 minutes.

3.0 OPERATIONAL REQUIREMENTS

3.1 Frequency Characteristics

3.1.1 Frequency Range: 50 MHz to 26.5 GHz

3.1.2 Frequency Resolution: The displayed frequency resolution shall be at least 1 MHz.

3.1.3 Frequency Accuracy (CW mode): The measured output frequency shall be within 1 ppm of the indicated or set output frequency.

3.1.4 Frequency Stability

3.1.4.1 Long Term Stability: Less than 1 pp 10^{-9}/hr after one hour warm-up
3.1.4.2 Phase Noise: At least -70 dBc/Hz at an offset 10 kHz
3.1.4.3 Residual FM Peak Deviation (BW = 50 Hz to 15 kHz)
3.1.4.3.1 Less than 1 kHz, for output frequencies up to 1 GHz
3.1.4.3.2 Less than the square root of (F/1000) where F is the carrier frequency in Hz, for output frequencies greater than 1 GHz

3.1.5 Spectral Purity (at least the limits specified below)

3.1.5.1 Harmonics/Sub-harmonics: At least -55 dBc
3.1.5.2 Non-harmonics/Spurious: At least -55 dBc

3.1.6 Reference Frequency

3.1.6.1 Internal Reference Output: 10 MHz; 1 Vrms into 50 ohms
3.1.6.2 External Reference Input: 10 MHz minimum; 1 Vrms into 50 ohms
3.1.6.3 External Reference Output: 10 MHz; 1 Vrms into 50 ohms

3.1.7 Frequency Lock Indicator: A light shall be provided which shall indicate that the output frequency is phase locked to the reference frequency.

3.2 Output Characteristics

3.2.1 Output Impedance/Connector: 50 ohms; Weinschel WPM-3 male/female or equivalent

3.2.1.1 VSWR: Less than 2:1

3.2.2 Output Level: -99 dBm to +5 dBm leveled

3.2.3 Output Resolution: 0.1 dBm in a digital readout

3.2.4 Level Accuracy (displayed level vs measured output level)

3.2.4.1 ±1.0 dB from 0.1 to 18 GHz; ±2.0 dB from 18 to 26.5 GHz for output levels greater than -40 dBm

3.2.4.2 Below -40 dBm, additional measurement uncertainty of ±0.2 dB/10 dB step down to -90 dBm

3.2.5 Level Loop Control Indicator: A light shall be provided which shall indicate that the output signal level is under active control of the feedback circuit in the leveling loop. An unleveled indication on this display shall mean that the output amplitude is unleveled regardless of the actual amplitude measured at the output.

3.3 Modulation Characteristics

3.3.1 Square Wave Modulation (internal)

3.3.1.1 Rate: 1 kHz fixed; variable from 100 Hz to 50 kHz

3.3.2 Pulse Modulation (internal)

3.3.2.1 Rate: 1 kHz fixed; variable from 100 Hz to 50 kHz
3.3.2.2 Width: 1 µsec fixed; variable from 0.1 to 10 µsec
3.3.2.3 Rise/Fall Time: Less than 25 nanosec
3.3.2.4 Overshoot/Undershoot/Ringing: ±2.0 dB maximum
3.3.2.5 Settling Time: ±1.0 dB of the final within 100 nanosec
3.3.2.6 On/Off Ratio: Greater than 40 dB

3.3.3 Pulse Modulation (external)

3.3.3.1 Rate: 10 Hz to 500 kHz
3.3.3.2 Width: 0.1 to 10 µsec
3.3.3.3 Triggering: Rising or falling edge

3.3.4 Sync Output: Modulation waveform, TTL compatible

3.4 Sweep Characteristics

3.4.1 Sweep Type: Discrete frequency steps, non-continuous

3.4.2 Range: 50 MHz to 26.5 GHz

3.4.3 Step Size: 1 MHz, 10 MHz, 100 MHz minimum

3.4.4 Step Time: Variable, 1 step/msec to 1 step/sec

3.4.5 Ramp Output: 0 to 10 volts, proportional to the frequency between selected sweep limits

3.4.6 Output Flatness: Within ±1.0 dB to 18 GHz; ±2.0 dB from 18 to 26.5 GHz

3.4.7 Sweep Mode: Auto (continuous), single, single step, reset

3.4.8 Sweep Trigger: External input for triggering sweep, TTL compatible

3.4.9 Pen Lift: TTL compatible output, low level during retrace

3.5 Power Meter

3.5.1 Frequency Range: 50 MHz to 26.5 GHz

3.5.2 External Measurement Range: +10 dBm to -30 dBm

3.5.3 Accuracy (indicated power level vs externally measured level):
±1.0 dB (+10 dBm to -10 dBm); ±2.0 dB (-10 dBm to -30 dBm)

3.5.4 Display (digital): 3.5 digits minimum

3.5.4.1 Resolution: 0.1 dB minimum for all power readings

3.5.5 Input Connector: Female, Weinschel WPM-3 or equivalent

3.6 Frequency Counter *

3.6.1 Input Range: At least 100 MHz to 26.5 GHz

3.6.2 Resolution: At least 100 Hz

3.6.3 Sensitivity: -25 dBm to 18 GHz; -20 dBm from 18 to 26.5 GHz

3.6.4 Mode: CW or Pulsed RF Input

3.6.4.1 Minimum PW for Pulsed RF Input: 0.5 µsec

3.6.5 Accuracy: At least 1 ppm

3.6.6 Input Impedance: 50 ohms nominal

3.6.7 Input Connector: Female, Weinschel WPM-3 or equivalent

4.0 GENERAL REQUIREMENTS

4.1 Power: 115/230 Vac ±10%, 50, 60, or 400 Hz, 350 watts maximum

4.2 Volume: Less than 65,548 cubic cm (4,000 cubic in)

4.3 Weight: Less than 29.1 kg (64 lbs)

4.4 Interface Control: The receiver shall be capable of being remotely controlled via the IEEE-488 interface bus, operating as both a talker and listener, having at least the following subset of bus functions: AH1, L4, SH1, T6, SR1, DC1 and RL1. Control of the following parameters is required:

Output Frequency	External Power Measure
Output Amplitude (-99 to +5 dBm)	External Frequency Measure
Sweep Function	Modulation: 1 µsec PW; 1 kHz PRF
Frequency Lock Status	Amplitude Level Status

4.5 Calibration Interval: The calibration interval shall be at least 12 months minimum. The equipment shall be within all accuracy requirements specified herein, with a 72% or greater confidence factor following a calibration interval of 12 months.

5.0 ACCESSORIES The following list of accessories shall be provided with each equipment.

5.1 One Gore-tex GMCA 190-1265 or equivalent coaxial cable, 6 ft long, with male Weinschel WPM-3 connectors or equivalent on each end

5.2 One Gore-tex GMCA 190-1265 or equivalent coaxial cable, 18 in long, with male Weinschel WPM-3 connectors or equivalent on each end

5.3 One male to female, Weinschel WPM-3 adapter or equivalent

5.4 One female to female, Weinschel WPM-3 adapter or equivalent

Frequency counter may be supplied as a separate piece of equipment; however, weight and volume restrictions apply to signal generator packages only.